telephony

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ALAN B. KAMMAN

World telecom market: size and potential

MOST OF THE numbers that one must use to describe the world's telecommunication markets are large. The headlines of telecommunication trade journals are filled with 'millions' and 'billions'; the statistics of common carriers are presented in columns headed by '10^3' and '10^6' multipliers; and so this article will necessarily be punctuated with those same large numbers. For example, Arthur D. Little's World Telecommunications Study II projects that the world will have at least 523 million main telephone stations in operation by 1991, and that growth will foster equipment markets totaling over $367 billion during the 1980-1990 period.

This article projects telecommunication markets over the next decade. It highlights the economic factors behind the markets—operating revenues and capital investments—for each of six regions. Patterns of changes are noted, and examples are cited to illustrate reasons for the various projections.

Market projections by different professional organizations, covering what appear to be similar subjects and periods, are often at variance.

The reason can usually be traced to differing definitions. Therefore, to avoid misinterpretation of our projections, here are a few definitions. The six *regional diversions* we use follow the United Nations (UN) convention: Latin America, North America, Africa, Asia, Europe and Oceania. The USSR is included in Asia. We speak of both *public and private systems*, including government-owned (nonmilitary) facilities in the later category. When a specific year is shown it stands for year-end and all fiscal year data has been adjusted to year-end.

Probably the most loosely-defined term among forecasters is 'market.' What is included? Does the projected amount cover freight and handling costs? Installation labor? Land and building space? To reduce the number of variables we define an equipment market in terms of 'shipments' as priced at the factory, not including such costs as on-site engineering and installation labor. We use US dollars as a monetary unit, with projections given in 1979 dollars and historical financial data given in dollars converted from national currencies at the year-end exchange rate of the year shown.

Alan B. Kamman is Vice President-Telecommunications Sciences at Arthur D. Little, Inc., Cambridge, Mass. This article has been adapted from a presentation made at the 3rd Telecommunication Forum at Telecom 79, held Sept. 20-26 in Geneva, Switzerland.

Current situation

The decade of the '70s has been most significant for the expansion of the world's *telephone* facilities: as we predicted in our 1970-71 report, while North America has historically had the predominant telephone population, by the end of 1980 there will be more telephone main stations connected in the European region than in North America—for the first time ever. Perhaps of even greater significance, by the end of 1980 we predict there will be more main stations installed in Asia than there were in North America in 1970.

The growth in telex service is another basic indication of the pace of 1970-80 telecommunication systems expansion. The number of

Continued on page 120

TABLE 1 *Major manufacturers of telecommunications equipment.*

COMPANY	Total Sales * 1976	Total Sales * 1977	Sales* of Telecommunications Equipment 1976	Sales* of Telecommunications Equipment 1977
Western Electric	6.93	8.14	6.93	8.14
ITT	14.88	16.69	3.35	3.77
Siemens	8.91	10.85	1.96	2.09
LM Ericsson	1.56	1.67	1.56	1.67
GTE	3.06	3.56	1.33	1.54
Northern Telecom	1.08	1.27	1.08	1.27
Nippon Electric	1.92	2.27	0.84	0.90
Philips	12.40	12.70	0.82	0.85
CGE	5.79	6.65	0.63	0.72**
Thomson CSF	3.43	4.01	0.60	0.70**
GEC	3.06	3.59	0.53	0.62**
Plessey	0.86	0.99	0.36	0.45**
	63.88	72.39	20.02	22.72**

*In billions of U.S. dollars.
**Arthur D. Little, Inc., estimates.

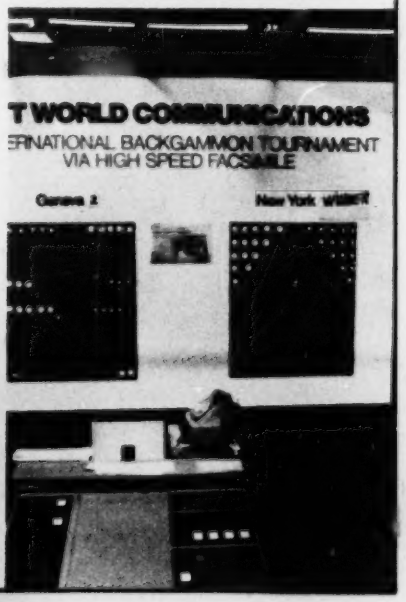
Seven-year-old Swiss lad throws the switch in a revolving microwave transmission display. Many family groups visited the exposition.

New Orleans jazz band was a big attraction in EIA/USA pavilion.

Big crowd puller was Comtech Labs' father-and-son walking, talking robots. Here, Gustaf Douglas (r) leads lost baby robot out of the L.M. Ericsson stand.

Grabbing a quick snack at an exposition hall lunch counter are TELEPHONY's Ed Robinson and Beatrice Ernst, of Telequal, Paris.

Transatlantic backgammon tournament conducted by ITT pitted Geneva team against one from New York. Final display shows New York as the winner. Facsimile transmission device is in foreground.



Four-way toast with California wine involves (l-r) William Vanden Heuvel, U.S. ambassador to UN missions; Werner Wolter, of ITU; President Robert Bunke of USITA; and U.S. Commerce Secretary Juanita Kreps.

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subscribers grew from 481,000 in 1970, to over 994,000 in 1977, and we estimate there will be over 1.3 million subscribers by the end of the decade. The scale of the European region's telex network continues to exceed all other regions and seems likely to do so for many years to come.

Several factors directly influence the rate of growth of telephone, telex and other facilities—beyond the pent-up demand for initial communication services. Among the driving factors is the financial health of the operating organization and the amount of revenues obtained. In 1975, we estimate that the world's telecommunications operating entities collected $87,794,000,000 in revenues, 45% of which was derived by North American common carriers. Relating markets to operating revenues, in our 1970-71 study we estimated the 1975 equipment market in the 33 countries we surveyed to be approximately $17 billion. Looking at 1980, we project that worldwide telecommunications operating revenues will exceed $171 billion, and equipment markets will reach about 30% of that amount.

Concerning markets in the decade 1970-1980, we estimate that buyers—principally common carriers—spent $188 billion for telecommunications equipment, of which about $52 billion will be spent in 1980.

Who supplies the equipment that is being purchased? Table 1 lists the major manufacturers and shows our estimation of their sales of telecommunications equipment. Western Electric supplies essentially to the U.S. market only, however the remaining manufacturers compete worldwide for market shares.

TABLE 2 *Telecommunications operating revenues.*

REGION	1975	1980	1990	% OF 1980 TOTAL	% OF 1990 TOTAL
North America	39.49*	66.90	122.09	39	32
Europe	26.56	56.49	164.27	33	43
Asia	17.20	38.70	80.22	23	21
Latin America	2.26	4.17	9.38	2	2
Oceania	1.65	3.37	4.33	2	1
Africa	0.64	1.58	3.85	1	1
	87.80	171.21	384.14		

*In billion (10^9) U.S. dollars.

TABLE 3 *Regional markets.*

REGION	Period of Shipments 1970-80	1980-90
North America	62.2*	103.4
Europe	76.3	176.7
Asia	39.1	59.7
Latin America	5.7	15.5
Africa	1.6	4.7
Oceania	3.3	6.7
	182.2	366.7

*In billion (10^9) U.S. dollars.

TABLE 4 *Equipment markets.*

EQUIPMENT	Period of Shipments 1970-80	1980-90
Telephone c.o. switching	47.3*	92.5
Long-haul transmission	27.7	53.1
Local distribution	60.4	117.4
Station apparatus	35.5	68.5
Other telecommunications eq.	17.3	35.2
	188.2	366.7

*In billion (10^9) U.S. dollars.

Market projections

The rapidly changing situation in the worldwide telecommunications market is best illustrated by a projection of public telephone systems, shown in Figure 1. As stated earlier, both Europe and Asia have exhibited strong telephone network growth since 1970, and we forecast continued rapid expansion in the '80s. In the early 1990s, the Asian network will also overtake North America's in size. Among the three regions with smaller scale networks, we project that Latin America and Africa will both have above average growth rates in the 1980s. Note that the Latin America telephone systems of 1990 will nearly match the 1970 Asian network in scale.

The relative distribution of telex subscribers worldwide is also changing, as illustrated in Figure 2. A particularly strong growth has been exhibited in the Asian region, which is projected to continue. By 1990, we predict that telex subscribers in Asia will outnumber those in North America, as the result of increases in the scale of LDC telex networks and the contrasting replacement usage of data and facsimile systems in North America.

Observing the related increases in telecommunications operating

'Several factors directly influence the rate of growth of telephone, telex and other facilities—beyond the pent-up demand for initial communications services.'

revenues, Table 2 shows the huge sums that are expected to accrue to telecom common carriers in specific years.

The changing regional relationships, which will be particularly evident in the 1980s, may be seen.

Equipment markets

With public telephone systems growth setting the pace, we project that the telecommunication equipment markets of the 1980s will nearly double the amounts shipped in the 1970s—from just under $190 billion to over $381 billion. In Table 3, we translate those estimates into regional shares, and show that the 1980-90 European market alone will nearly equal that of North America, Asia and Latin America combined.

To complete the equipment market picture, Table 4 shows total sales for the two decades, but subdivided by equipment category. Despite differences in the relative expenditures from category to category between countries—related to a country's size, and the technology being purchased—the percent of total market represented by switching, local distribution and station apparatus are likely to remain fairly constant for at least the next decade. Note that we expect transmission to take a slightly smaller share of the total market, and other telecommunications equipment (such as mobile radio systems) to increase in share.

Observations

In the most general classifications of markets one can place a country in one of four stages of telecommunications development. At the most fundamental level, telegraph is still important and telegraph traffic continues to increase. Telecommunications markets are small and the technology employed is quite mature.

At the next level, the emphasis is on telex systems and urban telephone service. Market emphasis shifts accordingly toward switching equipment.

At the third level, typified by most industrial countries in the world, automated nationwide telephone service is most important. In such markets the emphasis is increasingly on digital switching and transmission equipment. Regional and international coordination of equipment standards becomes vital to this third level market.

We see the next level—the most advanced market—to be where voice/data service combinations, "office of the future" services, and integrated fixed and mobile systems are coming into use. The services are provided over facilities that have been converted to digital equipment. The United States and a few other countries are presently evolving to this level. Most countries will be concerned with level four after 1990.

The world's telecommunications equipment markets will reach well over $40 billion annually by 1990, and will still be increasing at a steady pace. With approximately 523 million telephone main stations installed to serve a world population, that is expected to be 5302 million, we are still far short of a saturated market. □

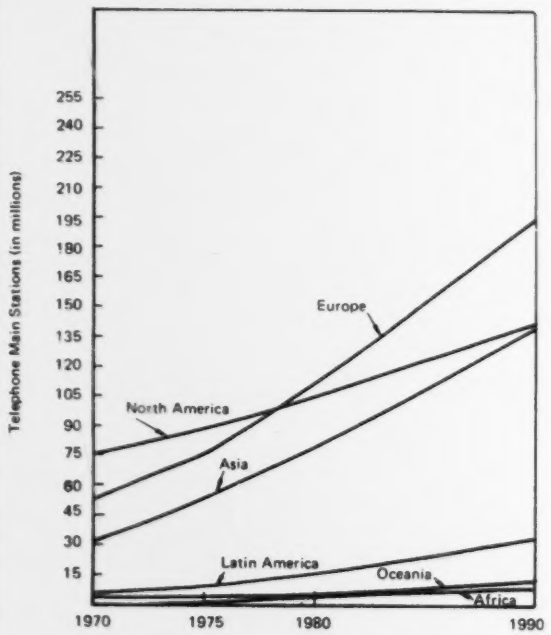

FIG. 1 *Projection of public telephone systems.*

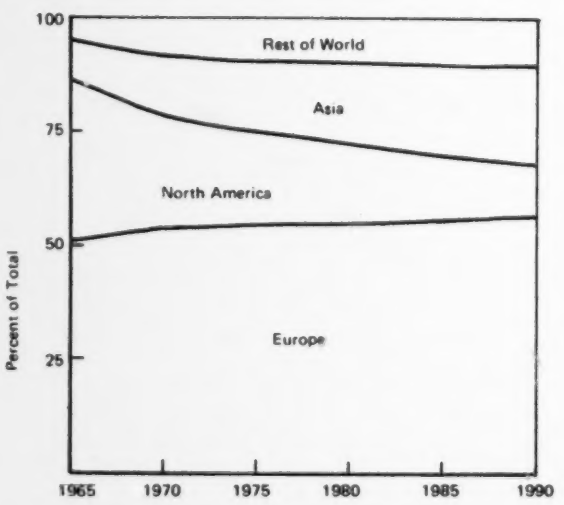

FIG. 2 *Projection of public telex subscribers.*

Source: Telex inder Welt data; Arthur D. Little, Inc., estimates.